

Multicolor Photometry and Age Estimates of Globular Clusters in M31

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Abstract. We present CCD multicolor photometry for 172 globular clusters (GCs), taken from the Bologna catalog (Battistini et al. 1987), in the nearby spiral galaxy M31. The observations were performed by using the National Astronomical Observatories 60/90 cm Schmidt Telescope in 13 intermediate-band filters, which covered a range of wavelength from 3800 to 10000 Å. This provides a multicolor map of M31 in pixels of 1.7×1.7 arcminutes. By aperture photometry, we obtain the spectral energy distributions (SEDs) for these GCs. Using the relationship between the Beijing-Arizona-Taiwan-Connecticut (BATC) intermediate-band system used for the observations and the UBVRI broad-band system, the magnitudes in the B and V bands are derived. The computed V and B-V are in agreement with the values given by Battistini et al. (1987) and Barmby et al. (2000). Finally, by comparing the photometry of each GC with theoretical stellar population synthesis models of Bruzual & Charlot (1996, hereafter BC96), we estimate ages of the sample GCs for different metallicities. The BC96 models provide the evolution in time of the spectrophotometric properties of simple stellar populations for a wide range of stellar metallicity. The results show that nearly all our sample GCs have ages more than 10^9 years, and most of them are around 10^{10} years old. At the same time, we find that GCs fitted by the metal-poor model are generally older than ones fitted by the metal-rich model.

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References

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